

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

Claim 1. (currently amended): An information processing device ~~for aiding control operations relating to controlling the position and orientation of a virtual object, said device comprising:~~

an image-capturing means for capturing unit constructed to capture a real object in real space into a taken image;

a position and orientation unit constructed to estimate a position and orientation of the image-capturing unit;

a constraining shape input unit constructed to specify three-dimensional coordinates respectively of points on a constraining plane to indicate at the same time the shape and position of the constraining plane in said real space;

a constraining shape generation unit constructed to generate a triangular patch from three points sequentially input by the constraining shape input unit and to generate a constraining shape based on at least one said constraining plane;

a virtual image generation means for generating unit constructed to generate a virtual image of a virtual object according to with respect to the position and orientation of said image capturing means-unit;

~~a synthesizing means for synthesizing unit constructed to synthesize~~ the virtual image generated by said virtual image generation ~~means unit~~ with the taken image generated by said image-capturing ~~means unit~~;

~~virtual object placement shape storage means for storing the shape of the virtual object;~~

~~a virtual object operating means for performing unit constructed to perform~~ six-degree-of-freedom operations of said virtual object;

~~constraining shape input means for specifying three dimensional coordinates respectively of points on a constraining plane to indicate at the same time the shape and position of the constraining plane in said real space;~~

~~constraining shape generating means for generating a constraining shape based on at least one said constraining plane; and~~

~~an operation aiding means for generating unit constructed to generate~~ restrictions on the operations performed by said virtual object operating ~~means unit~~ based on ~~the shape stored in said virtual object placement shape storage means and the said~~ constraining shape generated by said constraining shape generating ~~means unit~~; and

~~a display unit constructed to translucently display the triangular patch generated by said constraining shape generation unit.~~

Claim 2. (currently presented): An information processing device according to Claim 1, wherein the constraining shape is defined by polygons and the apexes of the polygons are at positions inputted by the user or the constraining shape is a plane passing through the positions inputted by the user, further comprising:

a parallel movement unit constructed to synchronize the position of said virtual object operating unit and that of said virtual object in two dimensions of the virtual image, ignore the movement of said virtual object operating unit in a third dimension, and prohibit the movement of said virtual object in the third dimension even if no collision is likely in the third dimension; and

an output unit constructed to update the virtual image in accordance with any performance by said operation aiding unit and said parallel movement unit.

Claim 3. (currently amended): An information processing device according to Claim 1, wherein said operating aiding ~~means~~-unit performs at least one of the following operations in performing an operation controlling the position and orientation of the virtual object:

a translation operation for causing translational movement of the virtual object based on the constraining shape; and/or

a rotation operation for rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact.

Claims 4.-19. (canceled).